Electron Guns for detecting Space Objects and Movement

Electron Guns for Detecting Space Objects and Movements

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Politecnico di Torino - Politecnico di Milano

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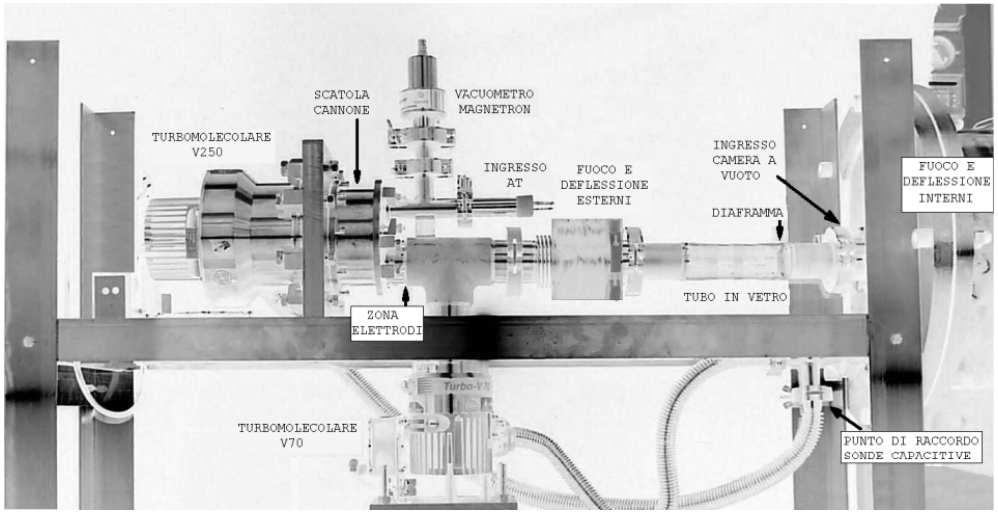
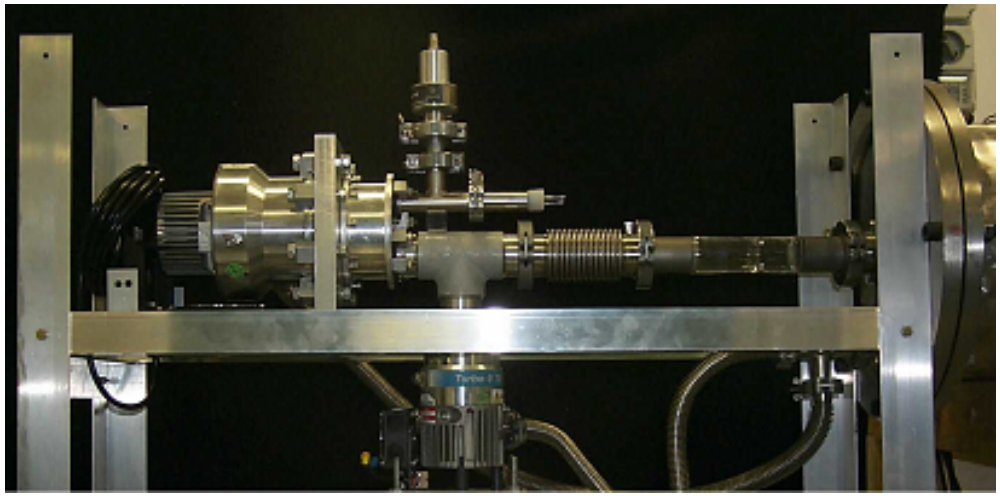
The electron gun





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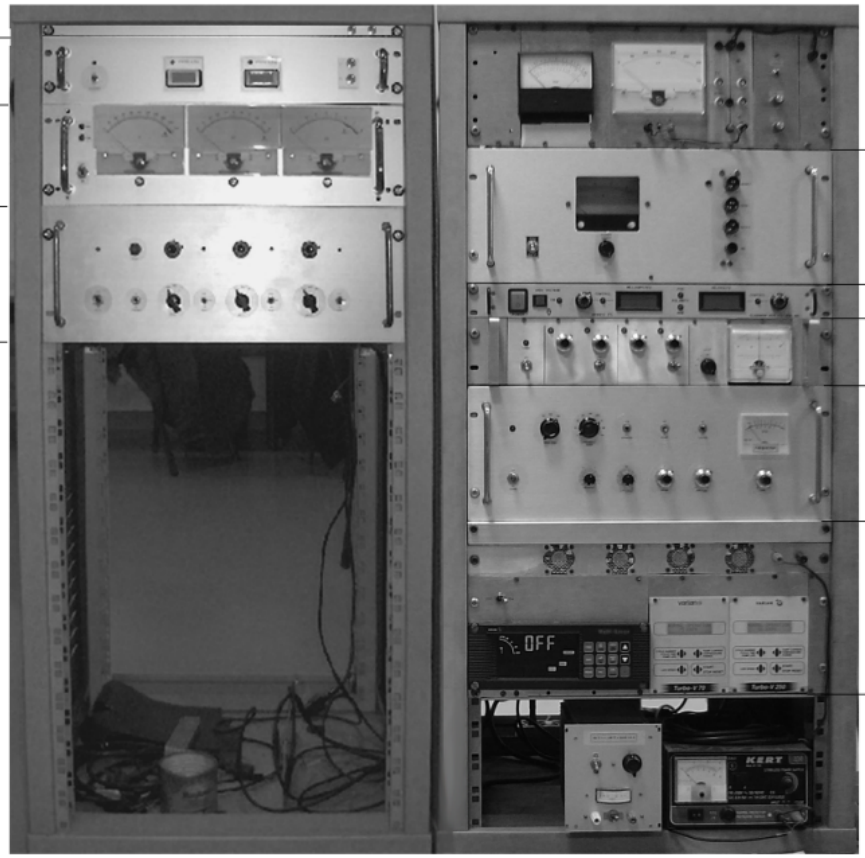
The control system



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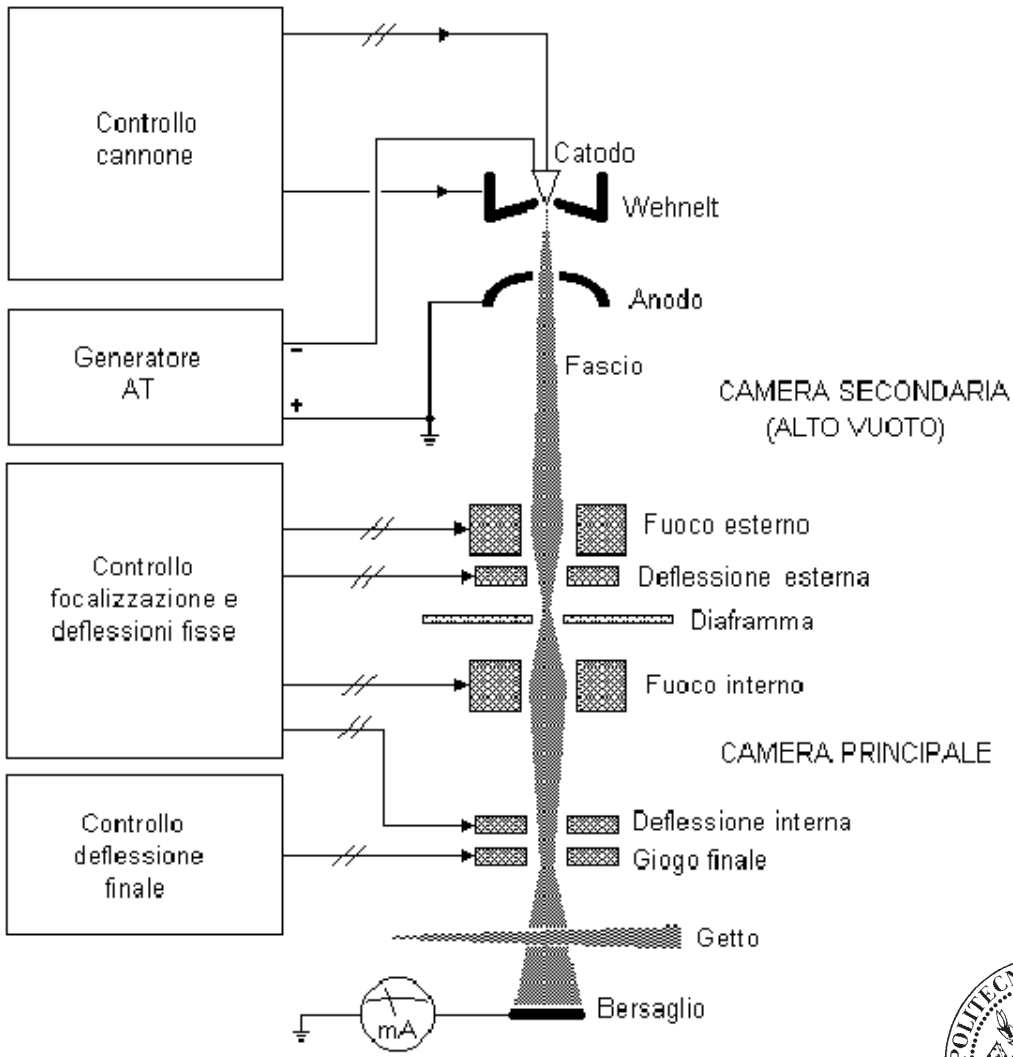
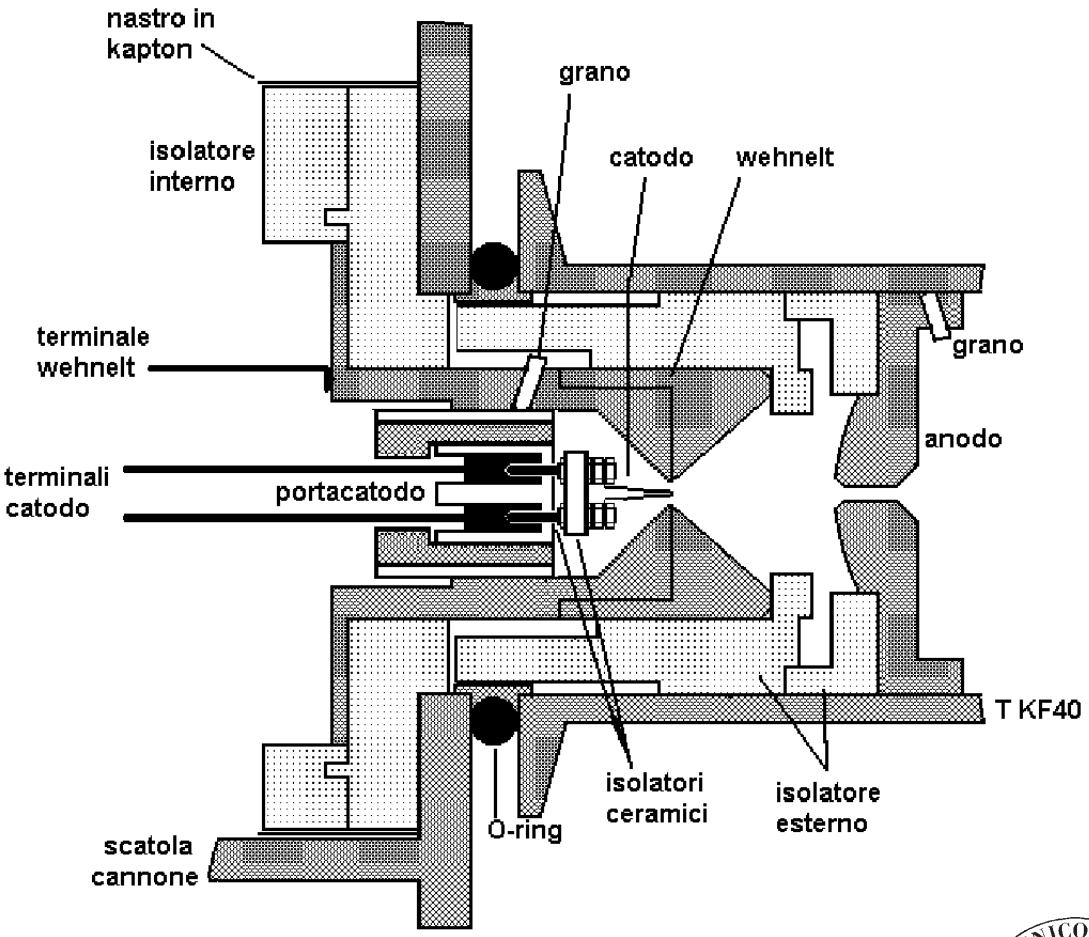
Block scheme of the gun



Gun interior



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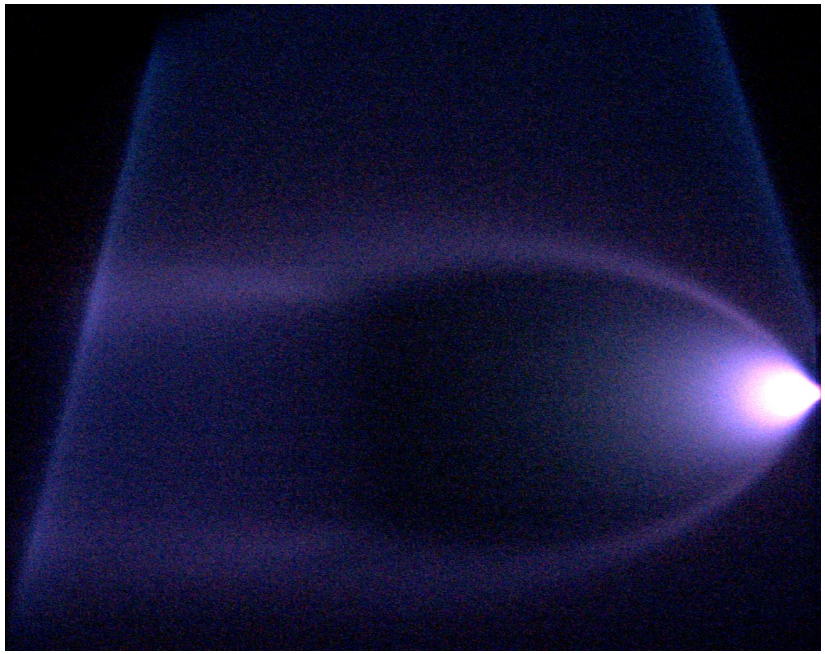
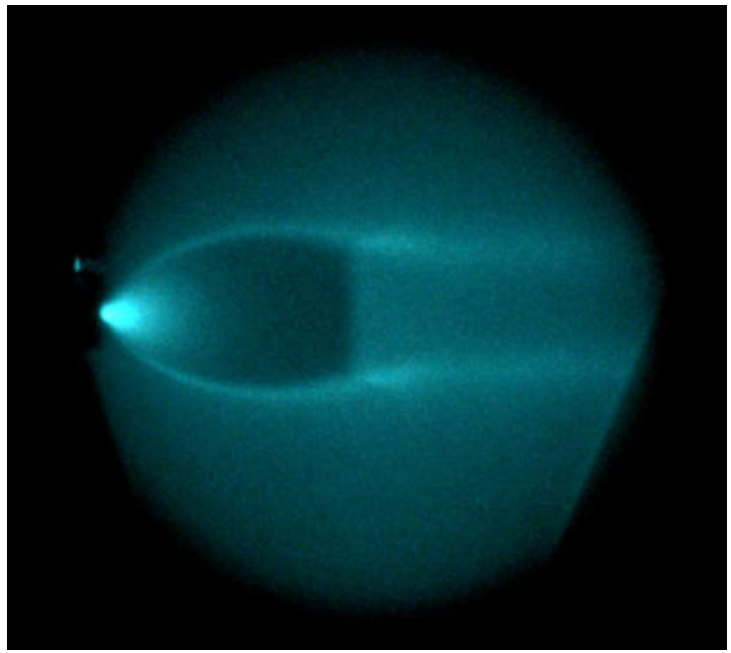
Astrophysics in the laboratory

New Journal of Physics **13** (2011): *videoabstract*

Underexpanded jet, Ar in He ($Ma = 29$, $Re = 3000$)





Phys.Rev. E **82** (2010) and *Exp.Fluids* **45** (2008)

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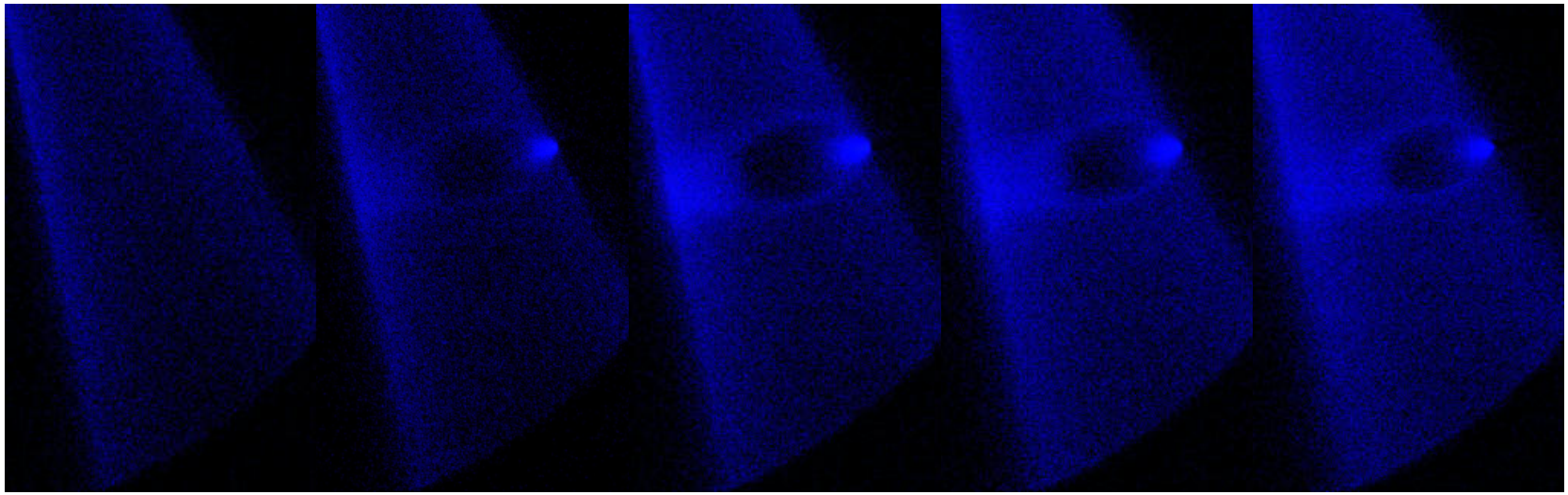
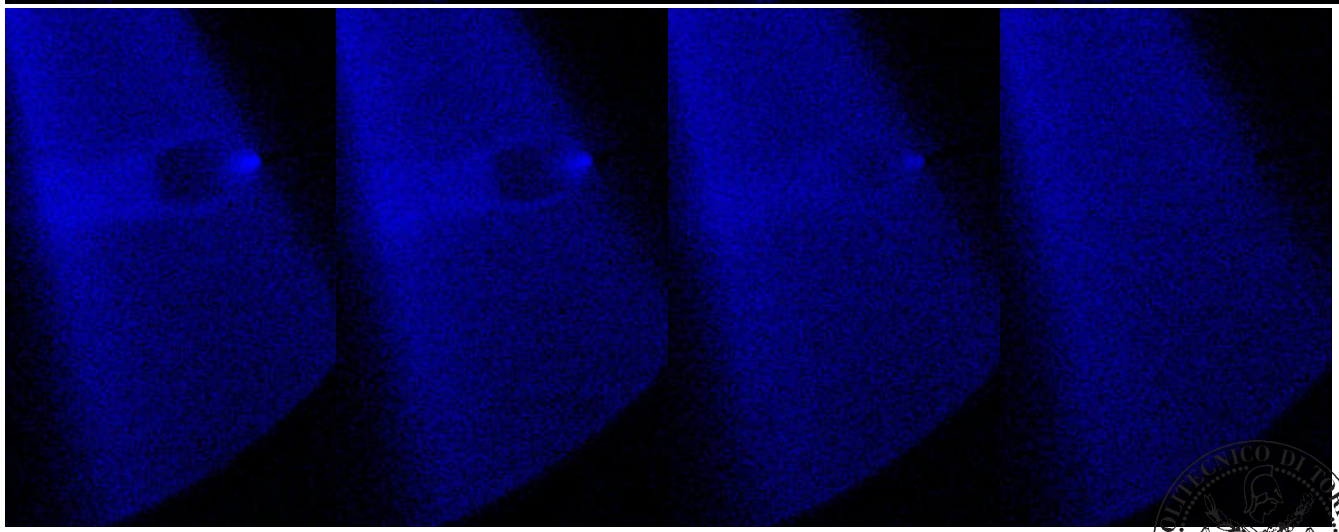
Astrophysics in the laboratory





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Development & applications

Incubator: 3 persons - a physicist, an electronic engineer and a mechanical engineer to design and build a few new prototypes of electron guns of different dimensions for different applications.

E.g.: current average cost of an EG for general research purposes:
$\approx$ 50,000 Euro
Our aim: to reduce the cost to $\approx$ 10,000 Euro
Foreseen R&D cost: $\approx$ 100,000 Euro

Decreasing the scale:

- nuclear and atomic laboratories, particle accelerators
- welding, electron erosion
- atrophysics in the lab *(achieved!)*
- space science
- electronic microscopes
- SED surface-conduction electron-emitter display